



22nd
ITS World Congress
Bordeaux, France
5 to 9 October
2015

Connected Corridors

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Topic: 2. Cooperative ITS Deployment Challenges
SIS27-G: Enabling interaction between traffic
management and mobility services

TOWARDS INTELLIGENT MOBILITY
Better use of space

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Integrated Corridor Management meets Connected Traveler



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Reality: Demand is Greater than Supply

Public Road Mileage, Lane Miles, and VMT , 1980 - 2010



Trends: How We Move ...

Population Increase

2015: **320 million people**
2045: **390 million people**

In 30 years our population is expected to grow by about

70 million

... that's more than the current populations of



Bumper-to-Bumper

On average, we spend

over **40**  hours stuck in traffic each year

The annual financial cost of congestion is

\$121 billion



Older Americans — Redefining Longevity

By 2045, the number of Americans over age 65 will increase by

77%



About **one-third of people over 65** have a disability that limits mobility. Their access to critical services will be more important than ever.

Millennials — Shaped by Technology

There are **73 million Millennials** aged 18 to 34. They are the first to have access to the internet during their formative years and will be an important engine of our future economy.

Millennials are driving less. By the end of the 2000s, they drove over **20% fewer miles** than at the start of the decade.



Income Inequality

10% of the population takes home **one-third** of our national income.

Transportation is the **second-largest** expense for U.S. households.



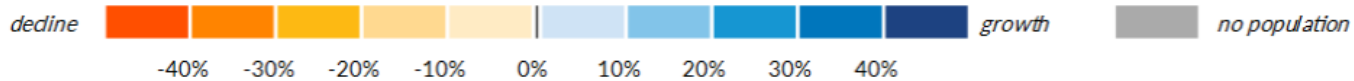
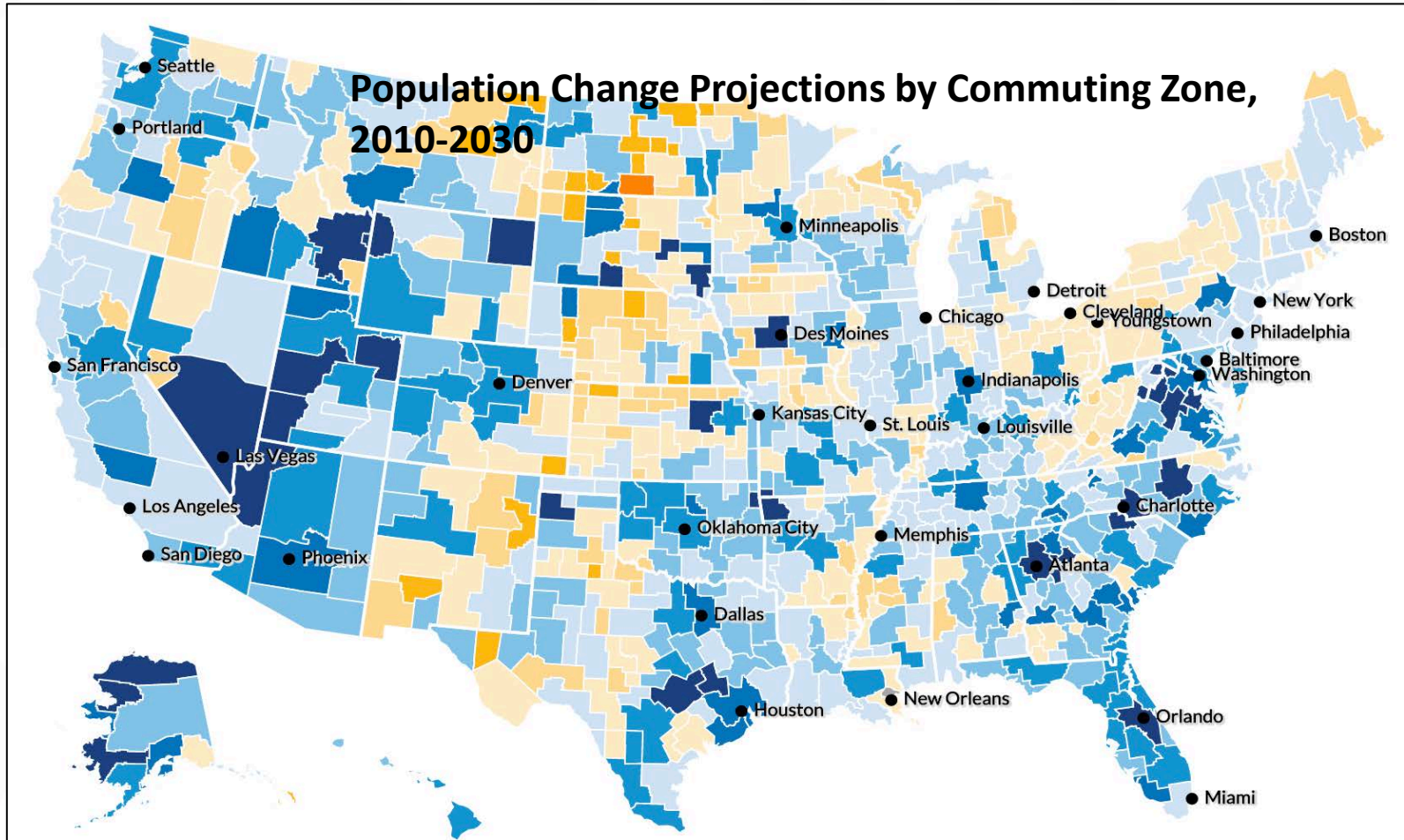
Megaregions and Shifts in Population Centers

11 megaregions are linked by transportation, economics, and other factors.

They represent over **75%** of our population and employment.

In 2014, **365,000** people moved to the South—up **25%** from 2013—and moves to the West doubled.

Trends: How We Move ...



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Trends: How We Move Things ...

Transportation and the Economy

By 2045, the U.S. economy is forecast to grow by **115%** to **\$36.7 trillion**—and the transportation sector will represent about

\$1.6 trillion

of total Gross Domestic Product.

Global Demand for U.S. Products

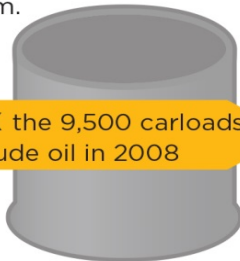
Global trade is one of the brightest spots in our economy.

U.S. exports reached **\$2.3 trillion** in 2013, setting a new record for the 4th straight year.

\$1 billion in exports = **5,000 U.S. jobs**

The U.S. energy boom

is placing unprecedented demand on our transportation system.



42x the 9,500 carloads of crude oil in 2008



Crude oil production is up **50%** since 2008

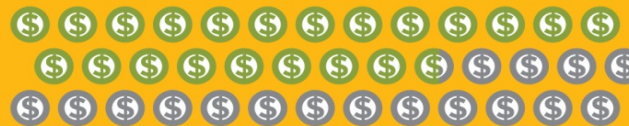
Rail carried **400,000** carloads of crude oil in 2013

By 2040, U.S. freight volume will grow to **29 billion tons**—an increase of **45%**.



Major gains in freight movement are predicted by 2040

By 2040, the **value** of freight will grow to **\$39 trillion**—an increase of **125%**.



54 million tons of freight move across our nation every day

Freight Movement is Multimodal

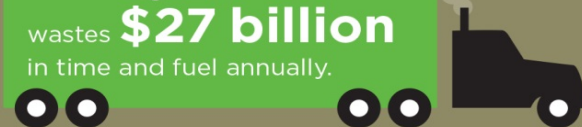
Every mode of transportation moves freight, but trucking is the primary mode of freight travel.

	2012	(in tons)	2040
Truck	13.2 billion	+43%	18.8 billion
Rail	2.0 billion	+37%	2.8 billion
Waterborne	975 million	+10%	1.1 billion
Air	15 million	+250%	53 million

System Performance and the Cost of Congestion

By 2040, nearly **30,000** miles of our busiest highways will be clogged on a daily basis.

Truck congestion wastes **\$27 billion** in time and fuel annually.



Trends: How We Move Things better

More and more, the transportation sector is relying on data to drive decisions, and on technology to reimagine how we move people and goods.

Connected Vehicles

Vehicles that communicate are the latest innovation in a long line of **successful safety advances**.

The motor vehicle fatality rate has dropped by

80%

over the past 50 years.

Connected vehicles and new crash avoidance technology could potentially address

81%

of crashes involving unimpaired drivers.

Robotics

Advances in robotics are changing transportation operations and will impact **the future transportation workforce**.

Robots will perform vital transportation functions, such as critical infrastructure inspection.

NextGen

GPS and new technologies are leading to a **safer, more efficient** U.S. airspace.

By 2020, **one-second updates** will pinpoint the **aircraft location and speed** of 30,000 commercial flights daily.

Real-time Travelers

Mobile access to everything from **traffic data** to **transit schedules** informs our travel choices.

90% of American adults own a mobile phone.

20% use their phones for **up-to-the-minute** traffic or transit information.

Smartphones are regularly used for **turn-by-turn navigation**.

Big data is all around us. Global data generated is projected to grow by **40%** annually.

Data enables innovative transportation options, such as **car-sharing**, **ride-sharing**, and **pop-up bus services**, and more **rapid delivery of goods**.

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SHIFTING TRANSPORTATION NORMS

TRADITIONAL

I own and use
my own
transportation

*Suburban
Rural*

TRENDING

I own my
transportation
and/or access
shared mobility
options

Urban Core

FUTURE

I access a
menu of
mobility options
to meet my
needs

*Urban Core
Suburban
Rural*

Source: Shared Use Mobility Center

USDOT Mobility on Demand (MOD) Vision

- Traveler Centric/Consumer Driven
 - Quality and Carefree personal mobility choice for individuals
- Data Connected/Platform Independent
 - Technology doesn't change the MOD vision
- Mode Agnostic/Multimodal
 - ALL modes and resources to support personal mobility choice
- USDOT Intermodal Offices Collaboration



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Role of PUBLIC Transportation



MOBILITY AS A SERVICE

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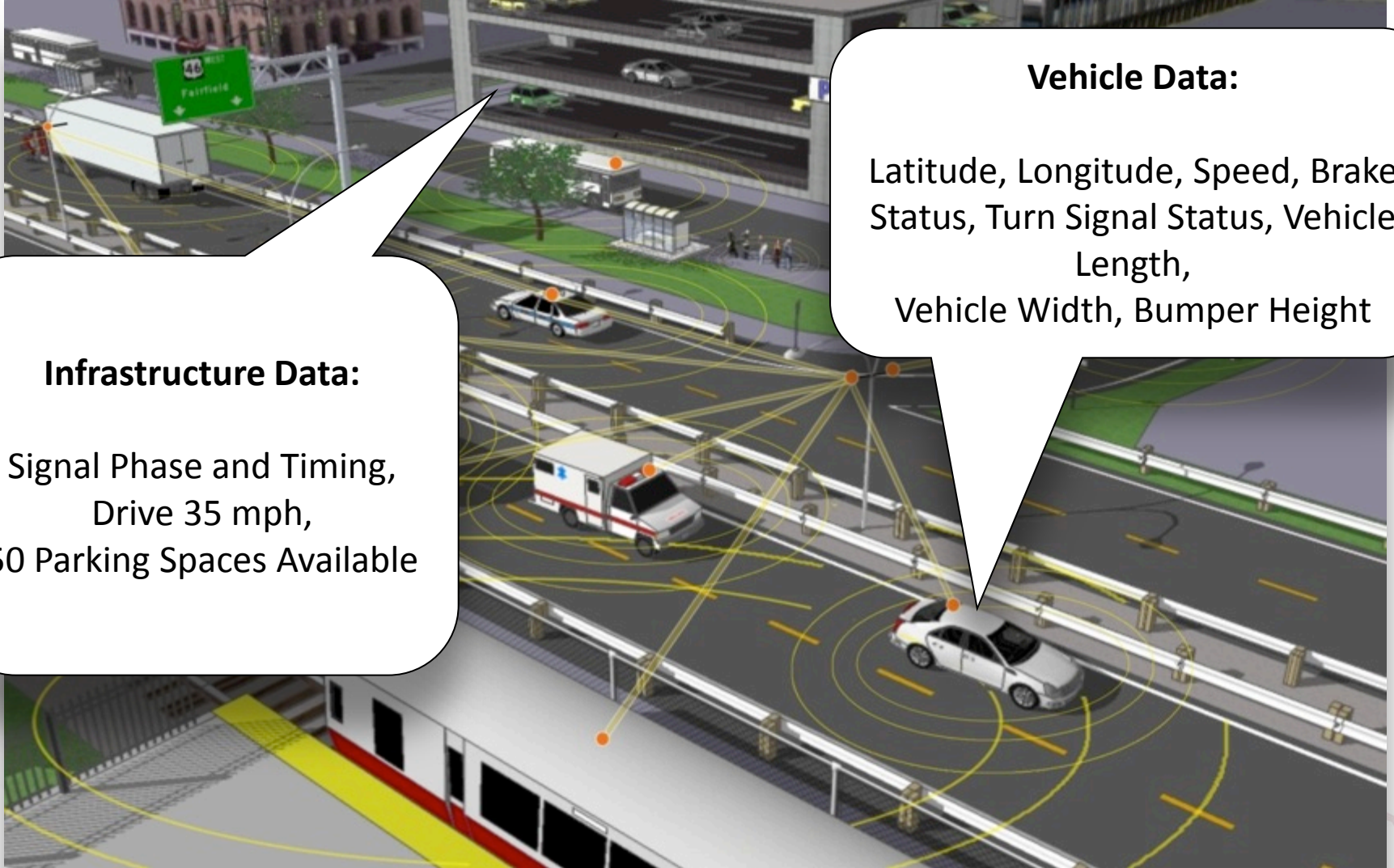
What is Mobility on Demand (MOD)?

- Long term strategic vision for a multimodal, integrated and connected transportation network system.
- A concept which imagines mobility as a commodity and a service.
- Conceptual Notions of MOD:
 - Promotes choice in personal mobility
 - Promotes Intelligent Transportation Systems
 - Advances connected vehicles
 - Advances vehicle automation
 - Leverages emerging technologies
 - Leverages data exchange
 - Encourages multimodal connectivity
 - Encourages system interoperability

**A New
~~Transit~~
Intermodal
Mobility
Concept**



Fully Connected Vehicles



Vehicle Data:

Latitude, Longitude, Speed, Brake Status, Turn Signal Status, Vehicle Length, Vehicle Width, Bumper Height

Infrastructure Data:

Signal Phase and Timing, Drive 35 mph, 50 Parking Spaces Available

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Connected Travelers

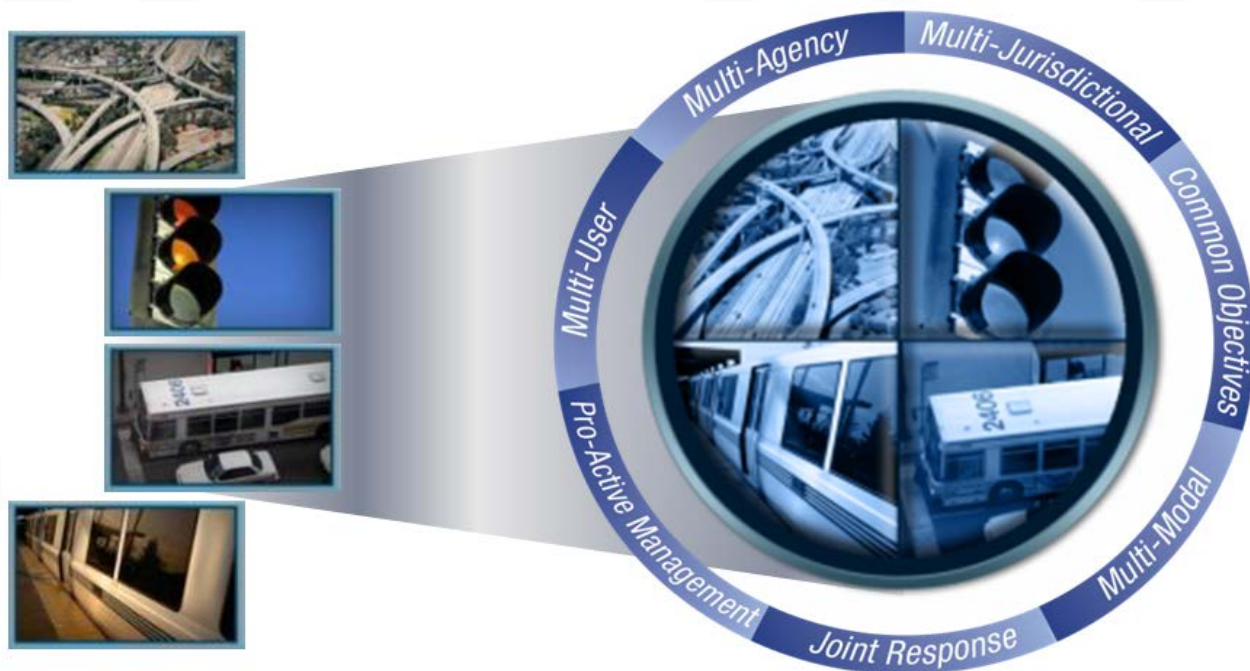
A system of "connected vehicles", roads and infrastructure, and mobile devices will provide a wealth of transportation data, from which innovative and transformative applications will be built. These apps will make travel not only safer, but smarter and greener. The possibilities are boundless.





Integrated Corridor Management

An opportunity exists to realize significant improvements in the efficient movement of people and goods through **integrated** and **proactive** management of major multimodal transportation corridors

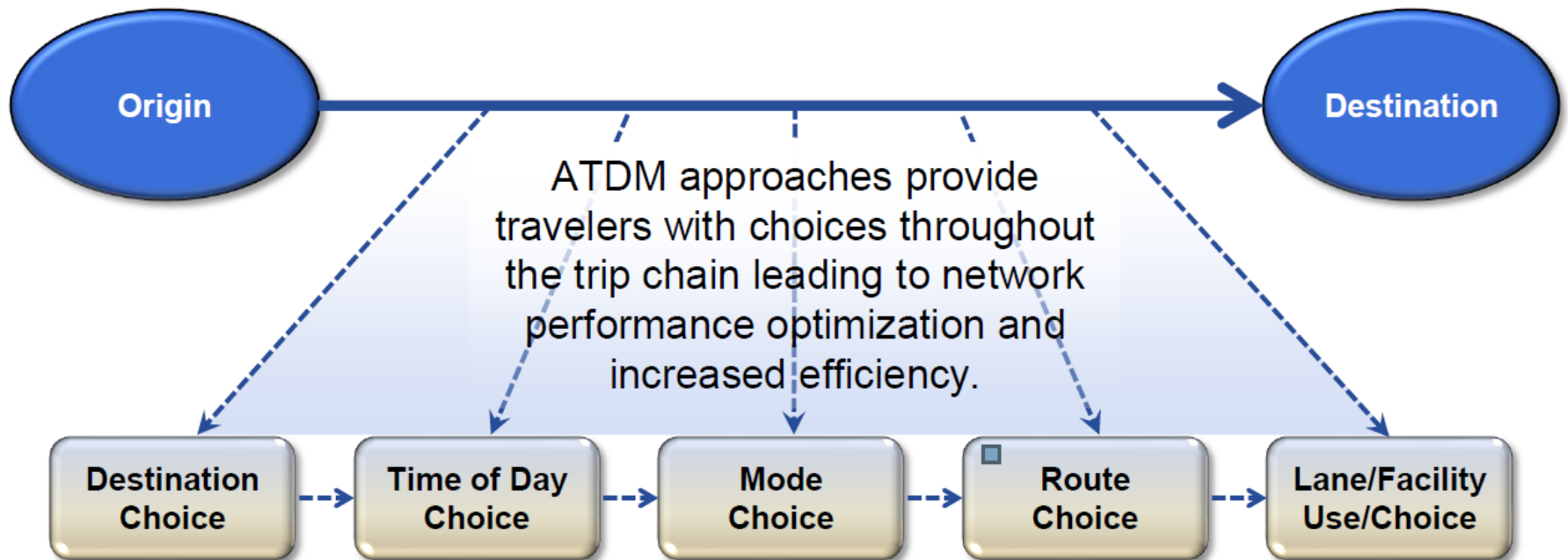


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Active management throughout the Trip Chain



Key Takeaway: Active management occurs before, during, and at the end of the trip chain



Stakeholders

Academia

**Professional
Organizations**

Who's here
today?
Who's missing?

**Roadway
Agencies**

**Planning
Organizations**

**Private
Sector**

**Transit
Agencies**

**Activity
Centers**

**Fleet
Operations**

**Public
Safety**

**Other agency
departments**

Traveler



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